

‘Please switch off your (im)mobile’: The demise of immobile learning in higher education

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Abstract: Mobile devices are more and more becoming indispensable tools in everyday life. However, universities continue to rely on the provision of fixed technologies such as computer labs for ICT-based instruction where in many cases mobile phones would be a much more appropriate choice. In this paper, we question the proliferation and continued provision of fixed technologies in universities, and suggest the need to instead adopt the widespread use of mobile phones for pedagogical purposes in university classrooms (and beyond). We review the affordances and potential barriers to extensive mobile penetration in learning contexts in higher education, and examine the pedagogical foundations of mobile learning and guidelines and principles emerging in recent research.

Mobile and immobile technologies in higher education

Although mobile phones have reached almost complete penetration of use and ownership among higher education students, their use in formal education contexts is only rarely encouraged. Surveys of higher education students in Australia indicate that almost every student owns a mobile device, many of which are web enabled (Moyle & Owen, 2009; Oliver & Whelan, 2010). Postgraduate students use mobile phones as a means of communication, but they also commonly choose to use these devices to access information, read e-books, listen to podcasts, and schedule events, as well as for more unusual activities such as creating audio and video presentations, and blogging (Kukulska-Hulme, et al., 2011). Based on similar data from the US, Lane (2010) concludes: “That student use of IT is fast shifting to the portable and the mobile is indisputable.” In light of these trends, Gartner predicts that mobile phones will replace PCs as the most common technology for accessing the internet by 2013 (Plummer, 2010).

It would appear that a small, powerful, portable, internet-ready device in every student’s possession would be a dream come true for university teachers. In the past, they could only have imagined that such powerful cognitive tools would be readily available for learning, and at no cost in terms of university budgets. More commonly, however, university students are asked to switch off their mobile phones, and texting, tweeting and other common activities are usually frowned upon in such contexts. The practice of ignoring the pedagogical potential of mobile phones continues, as classes requiring computing power are scheduled in learning spaces that incorporate fixed technologies such as computer laboratories.

Fitting out and maintaining fixed technologies is both expensive and time consuming. In this paper, we question the proliferation and continued provision of fixed technologies in universities, and suggest that we need to adopt the corollary of the frequently heard request to switch off mobile phones, and instead request – ‘please switch off your *immobile* device.’ We review the affordances and potential barriers to extensive mobile penetration in

learning contexts in higher education, and examine the pedagogical foundations of mobile learning and guidelines and principles emerging in recent research.

Learning spaces

The trend away from fixed, immobile devices is only just beginning in higher education. Tiered lecture theatres have been the traditional university learning space for many years. They reflect a view of learning that relies on the transmission of information by teachers and its passive assimilation by students. Fixed infrastructure include teacher ‘driven’ technologies that require an academic to be an audiovisual expert orchestrating lights, sound, projections and recording devices that have the aim of showcasing the teacher as performer rather than facilitating student learning.

Many universities continue to fit out expensive teaching laboratories, housing banks of computers requiring intensive and sometimes daily maintenance. Additional equipment includes screens, projectors, sound systems and other peripherals that are hardwired and fixed, in dedicated labs that must be booked ahead by teachers. Students often learn in a step-by-step manner, where the teacher needs to keep everyone progressing at the same rate, usually at the speed of the slowest learners. Problems with computers or software often delay progress. Students are following instructions on a computer that is not their own, and perhaps using a different operating system to their own computer, further impeding the ready transfer of skills they have been taught.

Modern learning spaces recognize the need to provide environments where learners can construct their own understandings in social contexts supported by technology (Poole, 2008). Mobile—rather than immobile—technologies advance this transition. Traditional computer labs where students typically learn *from* computers rather than *with* computers (Jonassen & Reeves, 1996) are gradually disappearing from modern university buildings. The trend is changing toward learning spaces that provide for flexibility, adaptability and student centered learning - spaces that enable the use of personal and mobile devices. For example, a new university building at the Royal Melbourne Institute of Technology (RMIT) currently under construction has deliberately planned for the elimination of computer labs (Fudge, 2010).

An Australian Learning and Teaching Council project entitled *Retrofitting uni learning spaces* conducted at the Queensland University of Technology (QUT), Charles Darwin University (CDU) and Edith Cowan University (ECU) provides a set of principles for modern learning spaces emphasizing mobility and flexibility. The project partners argue that “unfixing the technology and allowing it to move significantly increases the overall agility of a space to respond to different requirements” (*Retrofitting uni learning spaces*, n.d.). Displays can be flexible allowing plug and play; software such as *TeamSpot* enables students to use their mobile devices to interact with LCD screens and other student computers. Whiteboards, LCD screens, projectors and recording devices do not need to be fixed and stationary. Furniture such as student tables and chairs can be built on castors for rapid classroom reorganisation.

The latest *Horizon Report: Australian and New Zealand Edition* (Johnson, Smith, Levine & Haywood, 2010) indicates the need for higher education institutions to put in place the necessary infrastructure for mobile learning arguing that:

The promise of mobiles is ubiquitous access to not only the people with whom we communicate via a variety of means, but also to information, tools for learning and productivity, social networks, and more... Whether simple or full featured, mobiles connect us with the larger world, and a strong infrastructure to support that connection is increasingly in demand. (p. 5)

The cost of providing wireless infrastructure may well be offset by removing the infrastructure costs associated with immobile devices. The practice of *future proofing* buildings to support immobile devices continues to be expensive and commonplace in new builds.

Encouraging students to use their own personal mobile technologies also has clear benefits in facilitating student-centered, personal learning environments, where devices can be used as cognitive tools to investigate and explore complex issues and solve problems (Kim & Reeves, 2007).

Potential barriers to progress

While this paper argues for a move away from fixed immobile technologies, there may still be a need to have dedicated computers loaded with specialist software, particularly in cases where the licenses for such software are prohibitively expensive for campus-wide use. However, this scenario is not typical for most university students who could readily complete their studies with a basic suite of software, such as Microsoft Office or iWork, or increasingly, open source web-based programs (such as OpenOffice). Interestingly, what was once available as specialist software for desktop machines is becoming more accessible for mobile devices. For example, software for editing video such as iMovie has typically been used on desktop machines, however, this type of software is now readily available for mobile devices via the cloud.

There is also decreasing reliance on peripherals such as USB sticks and hard drives to transport files, as file hosting services allow for the storing and sharing of files with synchronization across multiple devices. For example, Dropbox uses cloud computing to provide mobile access to files through seamless integration with a user's computer, together with mobile and tablet devices through downloadable apps.

Mobile devices require access via cellular or wireless networks. Unfortunately, many universities enforce strict internet quotas on students (which limit their bandwidth and downloads) resulting in students having to use their own, often costly, cellular networks. Most universities provide wireless networks that are acceptable for single users located near wireless points. As the usage of mobile devices increases, it is necessary for institutions to provide access across larger teaching areas and enough bandwidth for multiple users. For many institutions, wireless access is only available for up to 30 users at any one time. However, recent WLAN implementation standards (IEEE 802.11n) and hardware improvements (e.g., Xirrus) are quickly enabling greater coverage and access. Efficient, expansive teaching spaces that accommodate large classes of 90 to 120 students using appropriate pedagogies (Heppell, 2010) can enable wireless access for all students without the need to provide multiple wireless, data and power points.

With the adoption of any new technology in educational contexts, pedagogy often lags behind the rapid advances in the technology itself, described by Mioduser, Nachmias, Oren & Lahav (1999) as 'one step forward for the technology, two steps back for the pedagogy' (p. 753). In the next section, we review pedagogical models for mobile learning, based on recent research that could assist teachers in higher education to design appropriate learning environments for mobile learners.

Principles of mobile learning design

Mobile devices enable students to learn *as they* are mobile. A number of recent studies have looked at developing university teaching or pedagogical strategies that support students' mobile learning.

In a study conducted at the University of Wollongong, staff implemented mobile learning using smartphones and iPods across a range of courses within a Faculty of Education (Herrington, Herrington, Mantei, Olney & Ferry, 2009). Students used their devices to address complex tasks across a range of subject areas, including adult education, early childhood, environmental education, literacy, ICT, science and visual arts. The devices were used as cognitive tools rather than as simple communication devices or delivery platforms, and the resulting pedagogies are adaptable to other higher education contexts.

From this study, the following characteristics were recommended for the incorporation of mobile learning into a higher education learning environment:

1. Real world relevance: Use mobile learning in authentic contexts
2. Mobile contexts: Use mobile learning in contexts where learners are mobile
3. Explore: Provide time for exploration of mobile technologies
4. Blended: Blend mobile and non mobile technologies
5. Whenever: Use mobile learning spontaneously
6. Wherever: Use mobile learning in non traditional learning spaces
7. Whomsoever: Use mobile learning both individually and collaboratively
8. Affordances: Exploit the affordances of mobile technologies
9. Personalise: Employ the learners' own mobile devices
10. Mediation: Use mobile learning to mediate knowledge construction.
11. *Produce*: Use mobile learning to produce and consume knowledge. (Herrington, Herrington, & Mantei, 2009, p. 134)

Research on the use of wireless mobile devices in tertiary education courses in New Zealand conducted by Cochrane and Bateman (2010) reports on a project where a community of practice was established to support action learning projects focused on “technology integration, pedagogical development, and institutional change...moving from a model of fixed, dedicated general computing to a mobile, wireless computing paradigm...” (p. 2). The results of the research identify the affordances of smartphones and a range of pedagogical approaches that support social constructivist activities. The authors suggest the following pedagogical success factors for integrating wireless mobile devices:

- The level of pedagogical integration of the technology into the course criteria and assessment
- The level of lecturer modeling of the pedagogical use of the tools
- The use of regular formative feedback from both lecturers and student peers
- Appropriate choice of mobile devices and software
- Technological and pedagogical support (Cochrane & Bateman, p. 12)

The work by Cochrane and Bateman (2010) and Herrington, et al. (2009) provide guiding principles that can be used to exploit the use of mobile devices in student-centered constructivist learning environments.

Mobile devices can also be used to socially construct understanding in more traditional teacher-centered learning spaces, such as in lecture theatres. Purdue University has recently developed *Hotseat* a social networking tool that allows students to use a range of mobile devices to enable ‘backchannel’ discussion and feedback in traditional lecture spaces. Teachers provide questions or comments and students are invited to provide short responses using their mobile devices. Students can then read, vote and comment on their peers’ postings (Agard, Bowen & Olesova, 2010).

Another example is a case of a history class at the University of Texas where Twitter was used to encourage otherwise reticent students to become more actively engaged in discussion in large classes. In the lecture class, students were able to tweet comments or questions on their mobile phones which displayed in a real-time feed at the front of the lecture theatre (Insidblog, n.d.).

The development of mobile applications or apps is increasingly providing support for mobile learning. For example, *Blackboard* has recently released its *Mobile Learn* app that enables students to access and interact with tools in Blackboard sites using native interfaces on a range of mobile devices.

Conclusion

There is a worldwide goal to increase overall participation in higher education. However, the mode of fixed buildings with dedicated fixed technologies within which education has traditionally been offered is unsustainable—physically, economically and pedagogically.

Mobile learning is providing opportunities for greater access to learning than previously would not have been possible. The Indira Gandhi Open University has recently partnered with Ericsson to provide 2.5 million Indian people with access to tertiary courses (Ericsson, 2009). In Australia, the Federal government has set impressive goals for higher education. The Review of Australian Higher Education Final Report (Bradley, Noonan, Nugent, & Scales, 2008) (also known as the *Bradley Report* after its Chairperson) set a student participation rate target of 40% of the population aged between 25 and 34 achieving a Bachelor degree by 2025. Currently the figure is around 30% (Bradley, et al., 2008). If we continue to teach in the same way by providing fixed immobile devices and a continuing reliance on building lecture theatres, the predicted infrastructure costs in Australia, for example, in meeting the Bradley target will be in the order of 20 billion dollars (Hanmer, 2010).

If such targets are to avoid the prohibitive cost and the pedagogically undesirable outcome of more and more buildings housing fixed technologies, then we have no alternative but to switch off our traditional ways of teaching with immobile devices, and move rapidly towards the adoption of collaborative, student-centered environments supported by mobile learning. This also makes sense economically. In the words of Bonk (2008), commenting on mobile learning (m-learning):

In underfunded schools and learning centers, m-learning is practically a no-brainer. It is difficult to name a technology that better fits the currently troublesome economic times. (p. 293).

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